Patent Application of

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for

Latch for Sponge Mop

Field of the Invention

This invention relates to fasteners and latches, and more particularly to an improvement in a type of quick release latch used to secure detachable sponges to sponge mops.

Background of the Invention

Sponge mops are well known in prior art, as are methods for securing detachable sponges to them. It is common practice to glue or similarly bond a rectangular sponge to a backing plate structure, which in turn is detachably secured to a mop head at or near each end of the sponge. The advantage of a detachable sponge is that it permits replacement of a worn out sponge without replacing the entire mop. A useful securing method for a detachable sponge should be reliable, quick and easy to use, and inexpensive to manufacture

Known securing methods include: (1) Round pins extending outward from a sponge backing plate that are frictionally secured in corresponding holes in a mop head. The sponge is detached by applying a force on the pins that is sufficient to overcome the friction fit. This method can be quick and inexpensive, but friction fits require close control of manufacturing tolerances, and thus may end up being too loose (the sponge falls off) or too tight (the sponge is difficult to remove). (2) Externally threaded pins extending outward from a sponge backing plate that pass through holes in a mop head and are secured on the far side by removable internally threaded nuts or caps. The sponge is detached by unscrewing the nuts or caps. This method is secure, but separate parts such as nuts or caps add cost, and are easy to lose. (3) Headed pins extending outward from a sponge backing plate that are secured in keyhole shaped apertures in a mop head. The sponge is detached by sliding or forcing the headed pins

out of their keyholes. This method is secure and does not require extra parts like caps or nuts, but the user may experience difficulty in manipulating the headed pins in and out of their keyholes. (4) Separate key-like fasteners passing through apertures in a mop head into corresponding keyholes in a sponge backing plate. The sponge is detached by turning or manipulating the key-like fasteners in such a way that they release from their keyholes. As above, separate parts are costly and can be lost. In addition, the procedure for releasing the key-like fastener may not be apparent to the user. (5) Latch tabs extending outward from a sponge backing plate that snap into corresponding apertures in a mop head. The sponge is detached by squeezing the tabs. Properly designed, this method can be quick, reliable and easy to use, and is inexpensive because no separate fasteners are required. My invention provides a novel and useful improvement to a latch of this particular known type.

Description of Prior Art

FIG. 1 shows a sponge mop of a design originated by Empire Brush, Inc., Greenville, NC (since acquired by Rubbermaid, Inc., Wooster, OH). The sponge is shown detached to reveal its latch mechanism, which is of the tab type (5) briefly described above. A pair of tabs is located near each end of the sponge, and snap into corresponding apertures in the mop head.

FIG. 2 shows an enlarged view of a pair of tabs near one end of the sponge shown in **FIG. 1**. The tabs are opposed to each other with a void in between. The upper and lower portions of each pair are spaced to fit closely within the corresponding mop head aperture, while the central portion ramps or slopes outward such that the dimension between the opposed tab ramps is larger than the aperture opening, thus creating an interference fit within the aperture. The base or root of each tab connects to a planar backing plate. The backing plate is glued or similarly bonded to the sponge. As shown in **FIG. 3**, the central void between the tabs continues outward for a short distance on both sides of each tab, such that the void is generally H-shaped viewed from above. The backing plate and tabs are integrally molded of a stiff thermoplastic resin such as polystyrene or polypropylene. As shown in **FIG. 4**, in cross-section the tabs are more or less a pair of L-shaped structures, with the lower legs opposed to each other and connecting to the planar backing plate.

To install the sponge onto the mop head the tab ends of each latch are pressed into the mop head apertures far enough that the ramped areas deflect, pass through the aperture, and spring

back to their original position, thus holding the sponge onto the mop head. To remove the sponge, the user squeezes and pushes on the tab ends protruding from each aperture.

Several problems occur when using this latch. When squeezed together the tabs tend to bend down towards the sponge instead of towards each other, thus requiring a larger movement to release them from the aperture. This is because the tabs bend or rotate around an axis offset outwardly and more or less in line with ends of the void extensions (e.g., the outward ends of the H-shaped void as viewed from above) rather than bending or rotating from their root or base. Additionally, if squeezed with excessive force they may break or fracture from a point propagating from the inside corner where they rise from the planar backing plate (e.g., the inside corner of the L-shaped cross sectional structure described above), particularly if molded from a notch sensitive thermoplastic resin such as polystyrene.

Summary of the Invention

The upper portions of the tab shaped latches of my invention are essentially identical to the prior art Empire latches described above. The novel and useful improvement in my invention is the manner in which the backing plates connect to each latch tab. The Empire prior art backing plate connects to each tab via the lower tip of a more or less L-shaped tab structure, whereas in my invention the root or base of each tab is connected to a beam structure running longitudinally more or less directly underneath the tab.

Each tab is centrally locate on a beam, the beam extending a short distance beyond either end of the tab until it interconnects with the sponge backing plate. This short section of beam beyond each end of each tab twists or rotates more or less torsionally when the tabs are squeezed together. Torsion stress in this beam member is more uniformly distributed than the bending stress concentrated at the inside corners of the L-shaped tab structures of the prior art Empire latch. Thus, the latch of my invention is less prone to breakage than the prior art Empire latch because the bending stress is more uniformly distributed over a larger area. The beam sections of the backing plate of my invention may be glued or bonded to the sponge, but the sponge is resilient and flexible enough that it has little or no effect on the torsion beams.

Since these torsion beams of my invention are located beneath the tabs, a squeezing action rotates or bends the tabs substantially towards each other, rather than downward towards the sponge as previously described. Thus, the latches of my invention are easier to release than

the prior art Empire latches because they do not have to be squeezed as far out of the way to pass through the mop head aperture. In addition, if the tabs do not have to flex or rotate as far to release, the beam cross-section can be increased, thus increasing the holding force of the latch by increasing its resistance to bending or deflection.

Brief Description of the Drawings

FIG. 1 is a perspective view of the prior art Empire sponge mop described above.

FIG. 2 is an enlarged view of a portion of **FIG. 1** showing the Empire prior art latch.

FIG. 3 is a top view of the above prior art latch.

FIG. 4 is a cross sectional view of the above prior art latch along lines **4-4** of **FIG. 3**.

FIG. 5 is a perspective view of a Milla sponge mop with its sponge detached to reveal my improved latch invention.

FIG. 6 is an enlarged view of my improved latch invention shown in **FIG. 3**.

FIG. 7 is a top view of my invention.

FIG. 8 is a cross sectional view of my invention along lines **8-8** of **FIG. 7**.

Reference Numerals Used in Drawings

20 improved latch
22 sponge mop
24 tab
26 sponge
28 void between tabs
30 upper portion of tab
32 lower portion of tab
34 mop head aperture
36 ramp
38 central portion of tab
40 beam
42 backing plate
44 beam segment
46 tab end

Detailed Description of the Drawings

Referring to **FIGS. 5** through **FIG. 8**, an improved latch **20** for a sponge mop **22** according to my invention is comprised of a pair of opposed tabs **24, 24** positioned more or less in line and centrally located at each end of a sponge **26**. The tabs **24, 24** are generally parallel to each other with a void **28** in between. An upper portion **30** and lower portion **32** of each pair of tabs **24, 24** are spaced to fit closely within a corresponding mop head aperture **34**, while a ramp **36** in a central portion **38** of the tab **24** slopes or angles outward such that the dimension between the opposed tab ramps **36, 36** is larger than the opening in the mop head aperture **34**, thus creating an interference fit within the aperture **34.**

Each tab **24** is centrally locate on a beam **40**, the beam **40** extending a short distance beyond either end of the tab **24** until it interconnects with a backing plate **42** that is formed from a grid of interconnecting beams. A short beam segment **44** beyond an end **46** of each tab **24** twists or rotates more or less torsionally when the tabs **24, 24** are squeezed together.

To install the sponge **26** onto the mop **22** the upper tab end portions **30** of each latch **20** are pressed into the mop head apertures **34, 34** far enough that the ramps **36** deflect inward, pass through the aperture **34**, and spring back to their original position, thus holding the sponge **26** onto the mop **22.** To remove the sponge **26**, the user squeezes and pushes on the upper portion of the tabs **30** that protrude from each mop head aperture **34.**

The present invention has now been described in connection with a number of specific embodiments thereof. However, modifications that are contemplated as falling within the scope of the present invention should now be apparent to those skilled in the art.